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EXAMINER

JACOBSON, TONY M

ART UNIT	PAPER NUMBER
2644	6

DATE MAILED: 12/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/832,587

Applicant(s)

ALLEGRO ET AL.

Examiner

Tony M. Jacobson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Specification

1. The incorporation of essential material in the specification by reference to a foreign application or patent, or to a publication is improper. Applicant is required to amend the disclosure to include the material incorporated by reference. The amendment must be accompanied by an affidavit or declaration executed by the applicant, or a practitioner representing the applicant, stating that the amendatory material consists of the same material incorporated by reference in the referencing application. See *In re Hawkins*, 486 F.2d 569, 179 USPQ 157 (CCPA 1973); *In re Hawkins*, 486 F.2d 579, 179 USPQ 163 (CCPA 1973); and *In re Hawkins*, 486 F.2d 577, 179 USPQ 167 (CCPA 1973).
2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The specification does not provide proper antecedent basis for the terms "primitive grouping method", "scheme-based grouping method", and "principles of gestalt theory", used in the claims. Any portions of the non-US patent references relied upon for definition of these terms must be directly included in the specification. Applicant is further reminded that any limitations intended for the claims must be explicitly stated in the claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Terms used in the

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claims are interpreted according to their broadest accepted meanings during the examination process.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 4, 5, 7, and 11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification does not describe a primitive grouping method, as claimed in claim 4; a scheme-based grouping technique, as claimed in claim 5; grouping auditory features along the principles of Gestalt theory, as claimed in claim 7; nor synthesizing an information signal for non-tonal speech components, as claimed in claim 11, in such a way as to enable one of ordinary skill in the art to make and use the invention.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. The term "different frequency bands" in claim 3 is a relative term, which renders the claim indefinite. The term "different" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The word "different" usually indicates a comparison, but it is not clear to what the frequency bands are being compared. The following rejection of claim 3 under 35 U.S.C. § 102(b) assumes Applicant intended to recite "a plurality of separate frequency bands", or the equivalent.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, and 8-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Lindemann et al. (US 5,651,071).

9. Regarding claims 1, 13, and 14, Lindemann et al. discloses a noise reduction system for a hearing aid (and thus, a hearing aid employing the system), that in normal operation performs a method for the elimination of spurious signal components in an input signal, comprising: the characterization, in a signal analysis phase, of signal components of the spurious signal components and of an information signal contained in the input signal (column 2, lines 37-53); and the determination or generation, in a signal processing phase, of the information signal or an estimated information signal on the basis of the characterization obtained in the signal analysis phase, said characterization of the signal components being performed under utilization at least of auditory-based features (M_1 to M_j) (e.g. column 4, lines 40-45).

10. Regarding claim 2, in the method performed by the system of Lindemann et al., loudness ("short-term amplitude deviation from long-term average" – column 3, lines 30-32), spectral profile (column 5, lines 4-10), harmonic structure (column 10, lines 36-56), coherent phases, and level differences (column 9, lines 26-53) are used for the characterization of the signal components.

11. Regarding claim 3, Lindemann et al. discloses throughout the specification (e.g. at column 8, lines 7-15) that the auditory features are determined in a plurality of frequency bands.

12. Regarding claim 8, Lindemann et al. discloses at column 11, lines 45-50 that the final voice-detect scaled noise reduction gain is used by multipliers (230) and (232) of Fig. 1 to scale the original left-ear and right-ear frequency domain signals, thus the signal components identified as spurious noise components are suppressed.

13. Regarding claim 9, Lindemann et al. recite in claim 5, "audio signal synthesizer for synthesizing left and right audio time domain signals from the noise reduced left and right audio frequency domain vectors", and disclose generally that the noise-reduced left and right audio frequency domain vectors are formed on the basis of the features detected in the signal analysis phase.

14. Regarding claim 10, Lindemann et al. discloses at column 10, lines 36-56 that with the aid of an analysis of the harmonic structure in the signal analysis phase (pitch estimate), different base frequencies of the signal component of the information signal or of the estimated information signal are extracted and, with the aid of a loudness analysis (computation of the dot product of the power spectrum with a candidate harmonic spectral grid), spectral levels of harmonics of these signal components are

defined, and on the basis of the spectral levels and the harmonics, an information signal for tonal speech components is synthesized (column 2, lines 26-34).

15. Regarding claim 12/10, Lindemann et al. discloses a column 1, lines 19-21 that noise reduction, as applied to hearing aids, means the attenuation of undesired signals and the amplification of desired signals. Thus the method performed by the hearing aid noise reduction system of Lindemann et al. amplifies the information signal or estimated information signal.

16. Claims 1, 11, and 12/11 are rejected under 35 U.S.C. 102(b) as being anticipated by Strong et al. (US 4,051,331).

17. Regarding claims 1 and 11, Strong et al. discloses a hearing aid system that in normal operation performs a method for the elimination of spurious signal components in an input signal (column 2, lines 6-13), comprising: the characterization, in a signal analysis phase, of signal components of the spurious signal components and of an information signal contained in the input signal (column 4, line 35 –column 5, line 30); and the determination or generation, in a signal processing phase, of the information signal or an estimated information signal on the basis of the characterization obtained in the signal analysis phase, said characterization of the signal components being performed under utilization at least of auditory-based features (M_1 to M_j) (column 6, lines 13-19), wherein with the aid of an analysis of the harmonic structure in the signal

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analysis phase (column 5, lines 17-27), non-tonal signal components of the information signal or of the estimated information signal are extracted and with the aid of a loudness or LPC analysis (Fig. 1, element 112), spectral levels of these signal components are defined , and with the aid of a noise generator an information signal for non-tonal speech components is synthesized (column 6, lines 46-51).

18. Regarding claim 12/11, Strong et al. discloses in Fig. 1 (element 160) and describes at column 6, line 65 –column 7, line 9 that the output of the sound generators (152) are applied to a digital summing circuit (156) where the outputs are combined to produce a resultant signal (an information signal or estimated information signal) which is applied to a multiplier (160), which is manually controllable by means of gain control circuit (164) to cause the multiplier (160) to multiply the signal received from the summing circuit to allow the user to control the average volume of the output signal. Thus the information signal or estimated information signal is amplified.

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20. Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lindemann et al. (US 5,651,071).

21. Regarding claims 4 and 5, Lindemann et al. does not disclose that the characterization of the signal components is performed by evaluating the features determined in the signal analysis phase employing a primitive-grouping method or a scheme-based grouping technique. Applicant's own disclosure admits that these methods/techniques are known in the prior art for grouping auditory features. (A.S. Bregman, Auditory Scene Analysis; G. Brown, Computational Auditory Scene Analysis: A Representational Approach; M. Cooke, Modeling Auditory Processing Analysis and Processing; and D.P.W. Ellis, Prediction-Driven Computational Auditory Scene Analysis, cited at pages 7-8 of the specification) It would have been obvious to one of ordinary skill in the art at the time the present invention was made to employ either of these known methods of the prior art for grouping the auditory features in the hearing aid of Lindemann et al.

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22. Regarding claim 6, Lindemann et al. discloses at column 9, lines 16-that a directionality estimate “d” is formed for each frequency bin of the frequency-domain signal vector, and this value is used to adjust the gains applied to each frequency bin, such that when a signal component is detected with equal magnitude and phase in both the left and right channels, the signal component is passed (multiplied by a value near 0.5) and when the magnitude and or phase differ, the signal component is subjected to a greater level of attenuation (multiplied by a value near zero). Thus a hypothesis is established or specified on the nature of the signal components (i.e. that target signal components will appear in both the left and right signal channels with equal magnitude and phase, while noise signal components will generally appear with differing magnitudes and phases in the two channels) and is taken into account in the grouping of the identified features, as broadly as disclosed and claimed.

23. Regarding claim 7 (7/6 and 7/5), as described above regarding claim 6, the noise reducing hearing aid of Lindemann et al. groups signal components according to whether they appear in both the left and right input channels with equal magnitude and phase. These are measures of “similarity”, which Applicant recites as a measure that relates to the principles of Gestalt theory (page 9, line 16 –page 10, line 20). Thus, the system of Lindemann et al. groups the auditory features along the principles of Gestalt theory as broadly as disclosed and claimed.

Conclusion

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

25. Beigi et al. (US 6,246,982) discloses a method for measuring distance between collections of distributions, usable in applications such as audio segmentation, which forms N-dimensional feature vectors for audio frames and groups similar feature vectors together.

26. Lockwood et al. (US 6,477,489) discloses a method for suppressing noise in a digital speech signal, which uses spectral subtraction, noise estimation, and harmonic analysis.

27. Raman (US 5,727,072) discloses a novel method of noise segmentation for noise cancellation in speech signals.

28. Liu (US RE38,269) discloses a system and method for speech enhancement in a speech coder.

29. Casey (US 6,321,200) discloses a method for extracting features from a mixture of signals, in which frequency-domain signals are windowed to produce a plurality of multi-dimensional observation matrices that are reduced in dimensionality by single

value decomposition and then temporal and spectral features are extracted from the reduced-dimensionality matrices using independent component analysis.

30. Nohara et al. (US 5,204,906) discloses a voice signal processing device which performs cepstral analysis on frequency-domain audio data, predicts the noise content of the signal, and applies spectral noise cancellation to the frequency-domain signal based on the predicted noise level and a vowel/consonant detection.

31. Elberling et al. (WO 9103042 A1) discloses a method and apparatus for classification of components of speech signals containing noise, in which the input signal is separated into a number of frequency-limited sub-signals, each containing at least two harmonics of the speech signal. The degree of synchronism between the envelopes of the sub-signals is determined and compared to a threshold to classify the input signal as to the degree it is affected by the speech signal.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony M. Jacobson whose telephone number is (703) 305-5532. The examiner can normally be reached on Mon. -Fri. 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.

tmj

December 15, 2003


XU MEI
PRIMARY EXAMINER